ATTACHMENT 3

Proposed Technical Specification Revisions

RTD Bypass Replacement

TABLE 1
TECHNICAL SPECIFICATIONS MODIFICATIONS

FUNCTION UNIT/PAGE NUMBER	MODIFICATION	JUSTIFICATION
Overtemperature ΔT Table 4.3.-1, Pages 3/4 3-8 and 3/4 3-12	Remove Note 12	Elimination of RTD Bypass Lines.
Reactor Coolant Flow Low Page 2-4	Added an allowable value of 88.7%	Application of W Setpoint Methodology.
Setpoint Tables 2.2-1 and 3.3-3 and Bases 2-2.1, 3/4-3.1, 3/4-3.2 Pages 2-3, 2-4, B2-3 3/4 3-13, 3/4 3-23, 3/4 3-25, 3/43-27, B3/4 3-1, and B3/4 3-2, 2-7, 2-8, 2-9 and 2-10	Added bases for using the 5 column setpoint format and provided values for functions implemented in the digital process system.	Application of W Setpoint Methodology.
Tables 4.3-1 and 4.3-2 pages 3/4 3-8, 3/4 3-29, 3/4 3-32, 3/4 3-34.	Changed analog channel operational test surveillance test interval to quarterly.	WCAP 10271 and subsequent W evaluation for digital process control equipment.
Tables 3.3-1 and 3.3-2, pages 3/4 3-2, 3/4 3-7, 3/4 3-15, 3/4 3-18, 3/4 3-22	Changed Surveillance testing.	WCAP 10271 and subsequent W evaluation for digital process control equipment.
Pressurizer Water Level High, page 2-4	Addition of Allowable Value, 92.2%	Application of W Setpoint Methodology.
Overtemperature ΔT page 2-7	RTD Response time constants.	Elimination of RTD bypass lines.
Overtemperature ΔT page 2-8	Reduced Delta I to 1.5, added allowable value of 1.5%.	W Safety Evaluation SECL 89-1164, and W Setpoint Methodology.
Overpower ΔT page 2-10	Removed Delta I Gain, added allowable value of 1.4%.	W Safety Evaluation SECL 89-1164, and W Setpoint Methodology.
Overpower ΔT page B 2-5	Removed Delta I Gain from bases.	W Safety Evaluation SECL 89-1164.
Tavg-LOW pages 3/4 3-23, 25 and 27.	Revised trip setpoint to 543 F and added an allowable value of 542.5 F.	Application of W Setpoint Methodology.

DEFINITIONS

THERMAL POWER

1.31 THERMAL POWER shall be the total reactor core heat transfer rate to the reactor coolant.

TRIP ACTUATING DEVICE OPERATIONAL TEST

1.32 A TRIP ACTUATING DEVICE OPERATIONAL TEST shall consist of operating the Trip Actuating Device and verifying OPERABILITY of alarm, interlock and/or trip functions. The TRIP ACTUATING DEVICE OPERATIONAL TEST shall include adjustment, as necessary, of the Trip Actuating Device such that it actuates at the required setpoint within the required accuracy.

UNIDENTIFIED LEAKAGE

1.33 UNIDENTIFIED LEAKAGE shall be all leakage which is not IDENTIFIED LEAKAGE or CONTROLLED LEAKAGE.

UNRESTRICTED AREA

1.34 An UNRESTRICTED AREA shall be any area at or beyond the SITE BOUNDARY access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, or any area within the SITE BOUNDARY used for residential quarters or for industrial, commercial, institutional, and/or recreational purposes.

VENTILATION EXHAUST TREATMENT SYSTEM

1.35 A VENTILATION EXHAUST TREATMENT SYSTEM shall be any system designed and installed to reduce gaseous radioiodine or radioactive material in particulate form in effluents by passing ventilation or vent exhaust gases through charcoal adsorbers and/or HEPA filters for the purpose of removing iodines or particulates from the gaseous exhaust stream prior to the release to the environment. Such a system is not considered to have any effect on noble gas effluents. Engineered Safety Features Atmospheric Cleanup Systems are not considered to be VENTILATION EXHAUST TREATMENT SYSTEM components.

VENTING

1.36 VENTING shall be the controlled process of discharging air or gas from a confinement to maintain temperature, pressure, humidity, concentration, or other operating condition, in such a manner that replacement air or gas is not provided or required during VENTING. Vent, used in system names, does not imply a VENTING process.

DIGITAL CHANNEL OPERATIONAL TEST

1.37 A DIGITAL CHANNEL OPERATIONAL TEST shall be the injection of a simulated signal into the channel as close to the sensor as practicable to verify OPERABILITY of alarm, interlock, and/or trip functions.

2.2 LIMITING SAFETY SYSTEM SETTINGS

REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS

2.2.1 The Reactor Trip System Instrumentation and Interlock Setpoints shall be set consistent with the Trip Setpoint values shown in Table 2.2-1.

APPLICABILITY: As shown for each channel in Table 3.3-1.

ACTION:

a. With a Reactor Trip System Instrumentation or Interlock Setpoint less conservative than the value shown in the Trip Setpoint column but more conservative than the value shown in the Allowable Value column of Table 2.2-1, adjust the setpoint consistent with the Trip setpoint value within permissible calibration tolerance.

b. With the Reactor Trip System Instrumentation or Interlock Setpoint less conservative than the value shown in the Allowable Values column of Table 2.2-1, ~~declare the channel inoperable and apply the applicable ACTION statement requirement of Specification 3.3.1 until the channel is restored to OPERABLE status with its Setpoint adjusted consistent with the Trip Setpoint value.~~ either:

1. **Adjust the Setpoint consistent with the Trip Setpoint value of Table 2.2.1 and determine within 12 hours that Equation 2.2-1 was satisfied for the affected channel or**

2. **Declare the channel inoperable and apply the applicable ACTION statement requirement of Specification 3.3.1 until the channel is restored to OPERABLE status with its setpoint adjusted consistent with the Trip Setpoint value.**

EQUATION 2.2-1 $Z + R + S \leq TA$

where:

Z = The value for column Z of Table 2.2-1 for the affected channel.

R = The "as measured" value (in percent span) of rack error for the affected channel,

S = Either the "as measured" value (in percent span) of the sensor error, or the value of Column S (Sensor Error) of Table 2.2-1 for the affected channel, and

TA = The value from Column TA (Total Allowance in % of span) of Table 2.2-1 for the affected channel.

TABLE 2.2-1

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	ALLOWANCE (TA)	Z	S	TRIP SETPOINT	ALLOWABLE VALUE #
1. Manual Reactor Trip	N.A.	N.A.	N.A.	N.A.	N.A.
2. Power Range, Neutron Flux					
a. High Setpoint	[ ]	[ ]	[ ]	≤109% of RTP**	≤[ ]% of RTP**
b. Low Setpoint	[ ]	[ ]	[ ]	≤25% of RTP**	≤[ ]% of RTP**
3. Intermediate Range, Neutron Flux	[ ]	[ ]	[ ]	≤25% of RTP**	≤[ ]% of RTP**
4. Source Range, Neutron Flux	[ ]	[ ]	[ ]	≤10^5 cps	≤[ ] x 10^5 cps
5. Overtemperature ΔT	7.2	4.8	3.0	See Note 1	SEE Note 2
6. Overpower ΔT	5.3	3.1	2.0	See Note 3	SEE Note 4
7. Pressurizer Pressure-Low	[ ]	[ ]	[ ]	≥1835 psig	≥[ ] psig
8. Pressurizer Pressure-High	[ ]	[ ]	[ ]	≤2385 psig	≤[ ] psig
9. Pressurizer Water Level-High	8.0	6.8	4.0	≤92% of instrument span	≤92.2% of instrument span
10. Reactor Coolant Flow-Low	4.6	2.7	0.8	>90% of loop design flow*	>88.7 % of loop design flow*
11. Steam Generator Water Level Low-Low	[ ]	[ ]	[ ]	>15% of narrow range instrument span	>[ ]% of narrow range instrument span

*Loop design flow = 89,500 gpm
**RTP = RATED THERMAL POWER

TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	ALLOWANCE(TA)	Z	S	TRIP SETPOINT	ALLOWABLE VALUE #
12. Steam/Feedwater Flow Mismatch Coincident With	[ ]	[ ]	[ ]	Feed Flow $\leq 0.64 \times 10^6$ lb/hr below steam flow	Feed Flow $\leq$[ ] $\times 10^6$ lb/hr below steam flow
Steam Generator Water Level-Low	[ ]	[ ]	[ ]	$\geq$15% of narrow range instrument span	$\geq$[ ]% of narrow range instrument span
13. Undervoltage - 4.16 kV Busses A and B	[ ]	[ ]	[ ]	$\geq$2496 volts-each bus	$\geq$[ ] volts-each bus
14. Underfrequency - Trip of Reactor Coolant Pump Breaker(s) Open	[ ]	[ ]	[ ]	$\geq$56.1 Hz	$\geq$[ ] Hz
15. Turbine Trip					
a. Auto Stop Oil Pressure	[ ]	[ ]	[ ]	$\geq$45 psig	$\geq$[ ] psig
b. Turbine Stop Valve Closure	N.A.	N.A.	N.A.	Fully Closed ***	Fully Closed ***
16. Safety Injection Input from ESF	N.A.	N.A.	N.A.	N. A.	N.A.
17. Reactor Trip System Interlocks					
a. Intermediate Range Neutron Flux, P-6	[ ]	[ ]	[ ]	$\geq 1 \times 10^{-10}$ amp	$\geq$[ ] amp

***Limit switch is set when Turbine Stop Valves are fully closed.

TABLE 2.2-1 (Continued)

REACTOR TRIP SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	ALLOWANCE (TA)	Z	S	TRIP SETPOINT	ALLOWABLE VALUE #
b. Low Power Reactor Trips Block, P-7					
1) P-10 input	[ ]	[ ]	[ ]	≤10% of RTP**	≤[ ]% of RTP**
2) Turbine First Stage Pressure	[ ]	[ ]	[ ]	≤10% Turbine Power	≤[ ]% Turbine Power
c. Power Range Neutron Flux, P-8	[ ]	[ ]	[ ]	≤45% of RTP**	≤[ ]% of RTP**
d. Power Range Neutron Flux, P-10	[ ]	[ ]	[ ]	≥10% of RTP**	≥[ ]% of RTP**
18. Reactor Coolant Pump Breaker Position Trip	N.A.	N.A	N.A.	N.A.	N.A.
19. Reactor Trip Breakers	N.A	N.A.	N.A.	N.A.	N.A.
20. Automatic Trip and Interlock Logic	N.A	N.A	N.A.	N.A.	N.A.

**RTP = RATED THERMAL POWER

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TABLE 2.2-1 (Continued)

TABLE NOTATIONS

NOTE 1: OVERTEMPERATURE ΔT

$$\Delta T\left\{\frac{1+\tau_1 S}{1+\tau_2 S}\right\}\left(\frac{1}{1+\tau_3 S}\right) \le \Delta T_0 \left\{K_1 - K_2 \frac{(1+\tau_4 S)}{(1+\tau_5 S)}\left[T\left(\frac{1}{1+\tau_6 S}\right) - T'\right] + K_3(P - P') - f_1(\Delta I)\right\}$$

Where: ΔT = Measured ΔT by RTD Instrumentation ~~(includes RTD response time)~~;

$\frac{1+\tau_1 S}{1+\tau_2 S}$ ~~$\frac{1}{1+\tau_1 S}$~~ = LEAD/ Lag compensator on measured ΔT; $\tau_1 = 8s$, $\tau_2 = 3s$

$\frac{1}{1+\tau_3 S}$ = LAG COMPENSATOR ON MEASURED ΔT; $\tau_3 = 0s$.

ΔT_0 = Indicated ΔT at RATED THERMAL POWER ~~(includes RTD response time)~~;

K_1 = 1.095;

K_2 = 0.0107/°F;

$\frac{1+\tau_4 S}{1+\tau_5 S}$ ~~$\frac{1+\tau_2 S}{1+\tau_3 S}$~~ = The function generated by the lead-lag compensator for T_{avg} dynamic compensation;

τ_4, τ_5 ~~τ_2, τ_3~~ = Time constants utilized in the lead-lag compensator for T_{avg}, τ_4 = 25s, τ_5 = 3 s;

T = Average temperature, °F;

$\frac{1}{1+\tau_6 S}$ = Lag compensator on measured T_{avg}; $\tau_6 = 0s$

~~τ_4 = Time constant utilized in the measured T_{avg} lag compensator, τ_4 + RTD response time = 2.5s;~~

T' ≤ 574.2°F (Nominal T_{avg} at RATED THERMAL POWER);

K_3 = 0.000453/psig;

P = Pressurizer pressure, psig;

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TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 1: (Continued)

P' = 2235 psig (Nominal RCS operating pressure);

S = Laplace transform operator, s^{-1};

and $f_1(\Delta I)$ is a function of the indicated difference between top and bottom detectors of the power-range neutron ion chambers; with gains to be selected based on measured instrument response during plant startup tests such that:

(1) For $q_t - q_b$ between - 14% and + 10%, $f_1(\Delta I) = 0$, where q_t and q_b are percent RATED THERMAL POWER in the top and bottom halves of the core respectively, and $q_t + q_b$ is total THERMAL POWER in percent of RATED THERMAL POWER;

(2) For each percent that the magnitude of $q_t - q_b$ exceeds - 14%, the ΔT Trip Setpoint shall be automatically reduced by ~~2.0%~~ 1.5% of its value at RATED THERMAL POWER; and

(3) For each percent that the magnitude of $q_t - q_b$ exceeds + 10%, the ΔT Trip Setpoint shall be automatically reduced by ~~3.5%~~ 1.5% of its value at RATED THERMAL POWER.

NOTE 2: ~~(This note number is not used.)~~ THE CHANNELS MAXIMUM TRIP SETPOINT SHALL NOT EXCEED ITS COMPUTED SETPOINT BY MORE THAN 1.5% OF INSTRUMENT SPAN.

TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: OVERPOWER ΔT

$$\Delta T \left\{\frac{1+\tau_1 S}{1+\tau_2 S}\right\}\left(\frac{1}{1+\tau_3 S}\right) \leq \Delta T_0 \left\{K_4 - K_5 \left(\frac{\tau_7 S}{1+\tau_7 S}\right)\cancel{\left(\frac{\tau_5 S}{1+\tau_5 S}\right)}\left(\frac{1}{1+\cancel{\tau_4}\,\tau_6 S}\right) T - K_6 \left[T \left(\frac{1}{1+\cancel{\tau_4}\,\tau_6 S}\right) - T''\right] - f_2(\Delta I)\right\}$$

Where: ΔT = As defined in Note 1,

$\frac{1+\tau_1 S}{1+\tau_2 S}$ = As defined in Note 1 INSERT

$\frac{1}{1+\tau_3 S}$ $\cancel{\frac{1}{1+\tau_4 S}}$ = As defined in Note 1,

$\cancel{\tau_4}$ τ_3 = As defined in Note 1,

ΔT_0 = As defined in Note 1,

K_4 = 1.09,

K_5 = 0.02/°F for increasing average temperature and 0 for decreasing average temperature,

$\frac{\tau_7 S}{1+\tau_7 S}$ $\cancel{\frac{\tau_5 S}{1+\tau_5 S}}$ = The function generated by the rate-lag compensator for T_{avg} dynamic compensation,

$\cancel{\tau_5}$ τ_7 = Time constants utilized in the rate-lag compensator for T_{avg}, $\cancel{\tau_5}$ τ_7 = 10 s,

$\frac{1}{1+\cancel{\tau_4}\,\tau_6 S}$ = As defined in Note 1,

$\cancel{\tau_4}$ τ_6 = As defined in Note 1,

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TABLE 2.2-1 (Continued)

TABLE NOTATIONS (Continued)

NOTE 3: (Continued)

K_6	=	$0.00068/^{\circ}F$ for $T > T''$ and $K_6 = 0$ for $T \leq T''$,
T	=	As defined in Note 1,
T''	=	Indicated T_{avg} at RATED THERMAL POWER (Calibration temperature for ΔT instrumentation, $\leq 574.2^{\circ}F$),
S	=	As defined in Note 1, ~~and~~
$f_2(\Delta I)$	=	~~As defined in Note 1.~~ 0 FOR ALL ΔI

NOTE 4: ~~(This note number is not used.)~~ THE CHANNEL'S MAXIMUM TRIP SETPOINT SHALL NOT EXCEED ITS COMPUTED TRIP SETPOINT BY MORE THAN 1.4% OF INSTRUMENT SPAN.

Insert

(AND NO ALLOWANCE (TA), Z, OR S

If no allowable value is specified as indicated by [ ], the trip ~~set point~~ setpoint shall also be the allowable value.

2.2.1 REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS

The Reactor Trip Setpoint Limits specified in Table 2.2-1 are the nominal values at which the Reactor trips are set for each functional unit. The Trip Setpoints have been selected to ensure that the core and Reactor Coolant System are prevented from exceeding their safety limits during normal operation and design basis anticipated operational occurrences and to assist the Engineered Safety Features Actuation System in mitigating the consequences of accidents.

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The setpoint for a reactor trip system or interlock function is considered to be adjusted consistent with the nominal value when the "as measured" setpoint is within the band allowed for calibration accuracy.

To accommodate the instrument drift that ~~may~~ occur between operational tests and the accuracy to which setpoints ~~can~~ be measured and calibrated, Allowable Values for the Reactor Trip Setpoints have been specified in Table 2.2-1. Operation with ~~a trip set~~ setpoints less conservative than the Trip Setpoint but within the specified Allowable Value is acceptable since an

Insert

allowance has been made in the safety analysis to accommodate this error. If no value is listed in the Allowable column, the setpoint value is the limiting setting.

Insert

For some functions, an optional provision has been included for determining the OPERABILITY of a channel when its trip setpoint is found to exceed the Allowable Value. The methodology of this option utilizes the "as measured" deviation from the specified calibration point for rack and sensor components in conjunction with a statistical combination of the other uncertainties in calibrating the instrumentation. In Equation 2.2-1, $Z + R + S \leq TA$, the interactive effects of the errors in the rack and the sensor, and the "as measured" values of the errors are considered. Z, as specified in Table 2.2-1, in percent span, is the statistical summation of errors assumed in the analysis excluding those associated with the sensor and rack drift and the accuracy of their measurement. TA or Total Allowance is the difference, in percent span, between the trip setpoint and the value used in the analysis for reactor trip. R or Rack Error is the "as measured" deviation, in percent span, for the affected channel from the specified trip setpoint. S or Sensor Drift is either the "as measured" deviation of the sensor from its calibration point or the value specified in Table 2.2-1, in percent span, from the analysis assumptions. Use of Equation 2.2-1 allows for a sensor drift factor, an increased rack drift factor, and provides a threshold value for REPORTABLE EVENTS.

The methodology to derive the Trip Setpoints includes an allowance for instrument uncertainties. Inherent to the determination of the Trip Setpoints are the magnitudes of these channel uncertainties. Sensors and other instrumentation utilized in these channels are expected to be capable of operating within the allowances of these uncertainty magnitudes.

Insert

Rack drift in excess of the Allowable Value exhibits the behavior that the rack has not met its allowance. Being that there is a small statistical chance that this will happen, an infrequent excessive drift is expected. Rack or sensor drift, in excess of the allowance that is more than occasional, may be indicative of more serious problems and should warrant further investigation.

2.2.1 REACTOR TRIP SYSTEM INSTRUMENTATION SETPOINTS

Continued from previous page
B 2-3

The various Reactor trip circuits automatically open the Reactor trip breakers whenever a condition monitored by the Reactor Trip System reaches a preset or calculated level. In addition to redundant channels and trains, the design approach provides a Reactor Trip System which monitors numerous system variables, therefore providing Trip System functional diversity. The functional capability at the specified trip setting is required for those anticipatory or diverse Reactor trips for which no direct credit was assumed in the safety analysis to enhance the overall reliability of the Reactor Trip System. The Reactor Trip System initiates a Turbine trip signal whenever Reactor trip is initiated. This prevents the reactivity insertion that would otherwise result from excessive Reactor Coolant System cooldown and thus avoids unnecessary actuation of the Engineered Safety Features Actuation System.

Manual Reactor Trip

The Reactor Trip System includes manual Reactor trip capability.

LIMITING SAFETY SYSTEM SETTINGS

BASES

Power Range, Neutron Flux

In each of the Power Range Neutron Flux channels there are two independent bistables, each with its own trip setting used for a High and Low Range trip setting. The Low Setpoint trip provides protection during subcritical and low power operations to mitigate the consequences of a power excursion beginning from low power, and the High Setpoint trip provides protection during power operations for all power levels to mitigate the consequences of a reactivity excursion which may be too rapid for the temperature and pressure protective trips.

The Low Setpoint trip may be manually blocked above P-10 (a power level of approximately 10% of RATED THERMAL POWER) and is automatically reinstated below the P-10 Setpoint.

Intermediate and Source Range, Neutron Flux

The Intermediate and Source Range, Neutron Flux trips provide core protection during reactor startup to mitigate the consequences of an uncontrolled rod cluster control assembly bank withdrawal from a subcritical condition. These trips provide redundant protection to the Low Setpoint trip of the Power Range, Neutron Flux channels. The Source Range channels will initiate a Reactor trip at about 10^5 counts per second unless manually blocked when P-6 becomes active. The Intermediate Range channels will initiate a Reactor trip at a current level equivalent to approximately 25% of RATED THERMAL POWER unless manually blocked when P-10 becomes active. No credit is taken for operation of the trips associated with either the Intermediate or Source Range Channels in the accident analyses; however, their functional capability at the specified trip settings is required by this specification to enhance the overall reliability of the Reactor Protection System.

Overtemperature ΔT

The Overtemperature ΔT trip provides core protection to prevent DNB for all combinations of pressure, power, coolant temperature, and axial power distribution, provided that the transient is slow with respect to piping transit delays from the core to the temperature detectors ~~(about 4 seconds)~~, and pressure is within the range between the Pressurizer High and Low Pressure trips. The setpoint is automatically varied with: (1) coolant temperature to correct for temperature induced changes in density and heat capacity of water and includes dynamic compensation for piping delays from the core to the loop temperature detectors, (2) pressurizer pressure, and (3) axial power distribution. With normal axial power distribution, this Reactor trip limit is always below the core Safety Limit as shown in Figure 2.1-1. If axial peaks are greater than design, as indicated by the difference between top and bottom power range nuclear detectors, the Reactor trip is automatically reduced according to the notations in Table 2.2-1. ~~Table 2.2-1, Note 1, provides the equation defining overtemperature ΔT. Inherent in the equation are time delays on measured ΔT and T_{avg} attributable to RTDs and lag compensators. A time delay of 2.5 seconds is introduced through a combination of RTD response time and adjustment of time constants τ_1 and τ_4.~~

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Overpower ΔT

The Overpower ΔT trip prevents power density anywhere in the core from exceeding 118% of the design power density. This provides assurance of fuel integrity (e.g., no fuel pellet melting and less than 1% cladding strain) under all possible overpower conditions, limits the required range for Overtemperature ΔT trip, and provides a backup to the High Neutron Flux trip. The setpoint is automatically varied with: (1) coolant temperature to correct for temperature induced changes in density and heat capacity of water, (2) rate of change of temperature for dynamic compensation for piping delays from the core to the loop temperature detectors~~, and (3) axial power distribution,~~ to ensure that the allowable heat generation rate (kW/ft) is not exceeded.

Pressurizer Pressure

In each of the pressurizer pressure channels, there are two independent bistables, each with its own trip setting to provide for a High and Low Pressure trip thus limiting the pressure range in which reactor operation is permitted. The Low Setpoint trip protects against low pressure which could lead to DNB by tripping the reactor in the event of a loss of reactor coolant pressure.

On decreasing power the Low Setpoint trip is automatically blocked by P-7 (a power level of approximately 10% of RATED THERMAL POWER with turbine first stage pressure at approximately 10% of full power equivalent); and on increasing power, automatically reinstated by P-7.

The High Setpoint trip functions in conjunction with the pressurizer safety valves to protect the Reactor Coolant System against system overpressure.

Pressurizer Water Level

The Pressurizer Water Level-High trip is provided to prevent water relief through the pressurizer safety valves. On decreasing power the Pressurizer High Water Level trip is automatically blocked by P-7 (a power level of approximately 10% of RATED THERMAL POWER with a turbine first stage pressure at approximately 10% of full power equivalent); and on increasing power, automatically reinstated by P-7.

Reactor Coolant Flow

The Reactor Coolant Flow-Low trip provides core protection to prevent DNB by mitigating the consequences of a loss of flow resulting from the loss of one or more reactor coolant pumps.

On increasing power above P-7 (a power level of approximately 10% of RATED THERMAL POWER or a turbine first stage pressure at approximately 10%

TABLE 3.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
1. Manual Reactor Trip	2	1	2	1, 2	1
	2	1	2	3*, 4*, 5*	9
2. Power Range, Neutron Flux					
a. High Setpoint	4	2	3	1, 2	2
b. Low Setpoint	4	2	3	1##, 2	2
3. Intermediate Range, Neutron Flux	2	1	2	1##, 2	3
4. Source Range, Neutron Flux					
a. Startup	2	1	2	2#.	4
b. Shutdown**	2	0	2	3, 4, 5	5
c. Shutdown	2	1	2	3*, 4*, 5*	9
5. Overtemperature ΔT	3	2	2	1, 2	~~6~~ 13
6. Overpower ΔT	3	2	2	1, 2	~~6~~ 13
7. Pressurizer Pressure-Low (Above P-7)	3	2	2	1	6
8. Pressurizer Pressure--High	3	2	2	1, 2	6
9. Pressurizer Water Level--High (Above P-7)	3	2	2	1	~~6~~ 13
10. Reactor Coolant Flow--Low					
a. Single Loop (Above P-8)	3/loop	2/loop	2/loop	1	6
b. Two Loops (Above P-7 and below P-8)	3/loop	2/loop	2/loop	1	6

TABLE 3.3-1 (Continued)

ACTION STATEMENTS (Continued)

ACTION 11 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 6 hours.

ACTION 12 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed until performance of the next required ACTUATION LOGIC TEST provided the inoperable channel is placed in the tripped condition within 1 hour.

ACTION 13 - With the number of OPERABLE channels one less than the Total number of channels, STARTUP and/or POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 1 hour. For subsequent required DIGITAL CHANNEL OPERATIONAL TESTS the inoperable channel may be placed in bypass status for up to 4 hours.

TABLE 4.3-1

REACTOR TRIP SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. Manual Reactor Trip	N.A.	N.A.	N.A.	R(11)	N.A.	1, 2, 3*, 4*, 5*
2. Power Range, Neutron Flux						
a. High Setpoint	S	D(2, 4), M(3, 4), Q(4, 6), R(4)	M	N.A.	N.A.	1, 2
b. Low Setpoint	S	R(4)	M	N.A.	N.A.	1***, 2
3. Intermediate Range, Neutron Flux	S	R(4)	S/U(1),M	N.A.	N.A.	1***, 2
4. Source Range, Neutron Flux	S	R(4)	S/U(1),M(9)	N.A.	N.A.	2**, 3, 4, 5
5. Overtemperature ΔT	S	R~~(12)~~	~~M~~ Q	N.A.	N.A.	1, 2
6. Overpower ΔT	S	R	~~M~~ Q	N.A.	N.A.	1, 2
7. Pressurizer Pressure--Low	S	R	M	N.A.	N.A.	1
8. Pressurizer Pressure--High	S	R	M	N.A.	N.A.	1, 2
9. Pressurizer Water Level--High	S	R	~~M~~ Q	N.A.	N.A.	1
10. Reactor Coolant Flow--Low	S	R	M	N.A.	N.A.	1
11. Steam Generator Water Level--Low-Low	S	R	M	N.A.	N.A.	1, 2

TABLE 4.3-1 (Continued)

TABLE NOTATIONS

(12) NOT USED. ~~CHANNEL CALIBRATION shall include the RTD bypass loops flow rate.~~

(13) Remote manual undervoltage trip when breaker placed in service.

(14) Interlock Logic Test shall consist of verifying that the interlock is in its required state by observing the permissive annunciator window.

(15) Automatic undervoltage trip.

3/4.3.2 ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

LIMITING CONDITION FOR OPERATION

3.3.2 The Engineered Safety Feature Actuation System (ESFAS) instrumentation channels and interlocks shown in Table 3.3-2 shall be OPERABLE with their Trip Setpoints set consistent with the values shown in the Trip Setpoint column of Table 3.3-3.

APPLICABILITY: As shown in Table 3.3-2.

ACTION:

a. With an ESFAS Instrumentation or Interlock Trip Setpoint trip less conservative than the value shown in the Trip Setpoint column but more conservative than the value shown in the Allowable Value column of Table 3.3-3, adjust the Setpoint consistent with the Trip Setpoint value within permissible calibration tolerance.

b. With an ESFAS Instrumentation or Interlock Trip Setpoint less conservative than the value shown in the Allowable Value column of Table 3.3-3, ~~declare the channel inoperable and apply the applicable ACTION statement requirements of Table 3.3-2 until the channel is restored to OPERABLE status with its Setpoint adjusted consistent with the Trip Setpoint value.~~ EITHER:

1. Adjust the Setpoint consistent with the Trip Setpoint value of Table 3.3-3 and determine within 12 hours that Equation 2.2-1 was satisfied for the affected channel, or

2. Declare the channel inoperable and apply the applicable ACTION statement requirements of Table 3.3-2 until the channel is restored to OPERABLE status with its setpoint adjusted consistent with the Trip Setpoint value.

EQUATION 2.2-1 $Z + R + S \leq TA$

where:

Z = The value for column Z of Table 3.3-3 for the affected channel.

R = The "as measured" value (in percent span) of rack error for the affected channel,

S = Either the "as measured" value (in percent span) of the sensor error, or the value of Column S (Sensor Error) of Table 3.3-3 for the affected channel, and

TA = The value from Column TA (Total Allowance in % of span) of Table 3.3-3 for the affected channel.

c. With an ESFAS instrumentation channel or interlock inoperable, take the ACTION shown in Table 3.3-2.

SURVEILLANCE REQUIREMENTS

4.3.2.1 Each ESFAS instrumentation channel and interlock and the automatic actuation logic and relays shall be demonstrated OPERABLE by performance of the ESFAS Instrumentation Surveillance Requirements specified in Table 4.3-2.

TABLE 3.3-2 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
f. Steam Line Flow--High Coincident with:	2/steam line	1/steam line in any two steam lines	1/steam line in any two steam lines	1, 2, 3*	15
Steam Generator Pressure--Low	1/steam generator	1/steam line in any two steam lines	1/steam generator in any two steam lines	1, 2, 3*	15
or T_{avg}--Low	1/loop	1/loop in any two loops	1/loop in any two loops	1, 2, 3*	~~15~~ 25
2. Containment Spray					
a. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3, 4	14
b. Containment Pressure--High-High Coincident with:	3	2	2	1, 2, 3	15
Containment Pressure--High	3	2	2	1, 2, 3	15
3. Containment Isolation					
a. Phase "A" Isolation					
1) Manual Initiation	2	1	2	1, 2, 3, 4	17
2) Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3, 4	14

TABLE 3.3-2 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

FUNCTIONAL UNIT	TOTAL NO. OF CHANNELS	CHANNELS TO TRIP	MINIMUM CHANNELS OPERABLE	APPLICABLE MODES	ACTION
4. Steam Line Isolation (Continued)					
d. Steam Line Flow--High Coincident with:	2/steam line	1/steam line	1/steam line	1, 2, 3	15
Steam Generator Pressure--Low	1/steam generator	1/steam generator in any two steam lines	1/steam generator in any two steam lines	1, 2, 3	15
or T_{avg}--Low	1/loop	1/loop in any two loops	1/loop in any two loops	1, 2, 3	~~15~~ 25
5. Feedwater Isolation					
a. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2	22
b. Safety-Injection	See Item 1. above for all Safety Injection initiating functions and requirements.				
6. Auxiliary Feedwater###					
a. Automatic Actuation Logic and Actuation Relays	2	1	2	1, 2, 3	20

TABLE 3.3-2 (Continued)

TABLE NOTATION (Continued)

ACTION 18 - With the number of OPERABLE channels one less than the Total Number of Channels, STARTUP and/or POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 1 hour.

ACTION 19 - With less than the Minimum Number of Channels OPERABLE, within 1 hour determine by observation of the associated permissive annunciator window(s) that the interlock is in its required state for the existing plant condition, or apply Specification 3.0.3.

ACTION 20 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 6 hours and in at least HOT SHUTDOWN within the following 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.2.1 provided the other channel is OPERABLE.

ACTION 21 - With the number of OPERABLE channels one less than the Total Number of Channels, restore the inoperable channel to OPERABLE status within 48 hours or declare the associated valve inoperable and take the ACTION required by Specification 3.7.1.5.

ACTION 22 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, be in at least HOT STANDBY within 6 hours; however, one channel may be bypassed for up to 2 hours for surveillance testing per Specification 4.3.2.1 provided the other channel is OPERABLE.

ACTION 23 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, comply with Specification 3.0.3.

ACTION 24 - With the number of OPERABLE channels one less than the Minimum Channels OPERABLE requirement, within 1 hour isolate the control room Emergency Ventilation System and initiate operation of the Control Room Emergency Ventilation System in the recirculation mode.

ACTION 25 - With the number of OPERABLE channels one less than the Total number of channels, STARTUP and/or POWER OPERATION may proceed provided the inoperable channel is placed in the tripped condition within 1 hour. For subsequent required DIGITAL CHANNEL OPERATIONAL TESTS the inoperable channel may be placed in bypass status for up to 4 hours.

TABLE 3.3-3

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	ALLOWANCE (TA)	Z	S	TRIP SETPOINT	ALLOWABLE VALUE#
1. Safety Injection (Reactor Trip, Turbine Trip, Feedwater Isolation, Control Room Isolation, Start Diesel Generators, Containment Cooling Fans, Containment Filter Fans, Start Sequencer, Component Cooling Water, Start Auxiliary Feedwater and Intake Cooling Water)					
a. Manual Initiation	N.A.	N.A.	N.A	N.A.	N.A.
-- b. Automatic Actuation Logic	N.A.	N.A.	N.A.	N.A.	N.A.
c. Containment Pressure--High	[ ]	[ ]	[ ]	≤6 psig	≤[ ] psig
d. Pressurizer Pressure--Low	[ ]	[ ]	[ ]	≥1715 psig	≥[ ] psig
e. High Differential Pressure Between the Steam Line Header and any Steam Line.	[ ]	[ ]	[ ]	≤150 psi	≤[ ] psi
f. Steam Line Flow--High	[ ]	[ ]	[ ]	≤A function defined as follows: A Δp corresponding to 0.64 x 10^6 lbs/hr at 0% load increasing linearly to a Δp corresponding to 3.84 x 10^6 lbs/hr at full load.	[ ]
Coincident with: Steam Generator Pressure--Low	[ ]	[ ]	[ ]	≥600 psig	≥[ ] psig
or T_{avg}--Low	4.0	2.0	1.0	≥543°F ~~≥531°F~~	≥542.5°F ~~≥[ ]°F~~
2. Containment Spray					
a. Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	N.A.
b. Containment Pressure--High-High Coincident with:	[ ]	[ ]	[ ]	≤30.0 psig	≤[ ] psig
Containment Pressure--High	[ ]	[ ]	[ ]	≤6.0 psig	≤[ ] psig

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	ALLOWANCE (TA)	Z	S	TRIP SETPOINT	ALLOWABLE VALUE#
3. Containment Isolation					
a. Phase "A" Isolation					
1) Manual Initiation	N.A.	N.A.	N.A.	N.A.	N.A.
2) Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	N.A.
3) Safety Injection	SEE ITEM 1			See Item 1 above for all Safety Injection Trip Setpoints and Allowable Values.	
b. Phase "B" Isolation					
1) Manual Initiation	N.A.	N.A.	N.A.	N.A.	N.A.
2) Automatic Actuation Logic and Actuation Relays	N.A	N.A.	N.A.	N.A.	N.A.
3) Containment Pressure--High-High	[ ]	[ ]	[ ]	≤30.0 psig	≤[ ] psig
Coincident with: Containment Pressure--High	[ ]	[ ]	[ ]	≤6.0 psig	≤[ ] psig
c. Containment Ventilation Isolation					
1) Containment Isolation Manual Phase A or Phase B	N.A.	N.A.	N.A.	N.A.	N.A.
2) Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	N.A.
3) Safety Injection	SEE ITEM 1			See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.	
4) Containment Radioactivity--High (1)	[ ]	[ ]	[ ]	Particulate (R-11) <6.1 x 10^5 CPM Gaseous (R-12) See (2)	[ ]

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM
INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	ALLOWANCE (TA)	Z	S	TRIP SETPOINT	ALLOWABLE VALUE#
4. Steam Line Isolation					
a. Manual Initiation	N.A.	N.A	N.A.	N.A.	N.A
b. Automatic Actuation Logic and Actuation Relays	N.A	N.A	N.A.	N.A.	N.A.
c. Containment Pressure--High-High Coincident with:	[ ]	[ ]	[ ]	≤30.0 psig	≤[ ] psig
Containment Pressure--High	[ ]	[ ]	[ ]	≤6.0 psig	≤[ ] psig
f. Steam Line Flow--High	[ ]	[ ]	[ ]	≤A function defined as follows: A Δp corresponding to 0.64 x 10^6 lbs/hr at 0% load increasing linearly to a Δp corresponding to 3.84 x 10^6 lbs/hr at full load.	[ ]
Coincident with: Steam Line Pressure--Low	[ ]	[ ]	[ ]	≥600 psig	≥[ ] psig
or T_{avg}--Low	4.0	2.0	1.0	≥543°F ~~≥531°F~~	≥542.5°F ~~≥[ ]°F~~
5. Feedwater Isolation					
a. Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	N.A.
b. Safety Injection	SEE ITEM 1			See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.	
6. Auxiliary Feedwater (3)					
a. Automatic Actuation Logic and Actuation Relays	N.A.	NA	N.A.	N.A.	N.A.
b. Steam Generator Water Level--Low-Low	[ ]	[ ]	[ ]	≥15% of narrow range instrument span.	≥[ ]% of narrow range instrument span.
c. Safety Injection	SEE ITEM 1			See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.	

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	ALLOWANCE (TA)	Z	S	TRIP SETPOINT	ALLOWABLE VALUE#
6. Auxiliary Feedwater (Continued)					
d. Bus Stripping	SEE ITEM 7			See Item 7. below for all Bus Stripping Setpoints and Allowable Values.	
e. Trip of All Main Feedwater Pump Breakers.	N.A.	NA.	N.A	N.A.	N.A.
7. Loss of Power					
a. 4.16 kV Busses A and B (Loss of Voltage)	NA	NA.	NA.	N.A.	N.A.
b. 480V Load Centers (Instantaneous Relays) Degraded Voltage					
Load Center					
3A	[ ]	[ ]	[ ]	436V±5V (10 sec ± 1 sec delay)	[ ]
3B	[ ]	[ ]	[ ]	416V±5V (10 sec ± 1 sec delay)	[ ]
3C	[ ]	[ ]	[ ]	417V±5V (10 sec ± 1 sec delay)	[ ]
3D	[ ]	[ ]	[ ]	428V±5V (10 sec ± 1 sec delay)	[ ]
4A	[ ]	[ ]	[ ]	415V±5V (10 sec ± 1 sec delay)	[ ]
4B	[ ]	[ ]	[ ]	414V±5V (10 sec ± 1 sec delay)	[ ]
4C	[ ]	[ ]	[ ]	401V±5V (10 sec ± 1 sec delay)	[ ]
4D	[ ]	[ ]	[ ]	403V±5V (10 sec ± 1 sec delay)	[ ]
Coincident with: Safety Injection and	SEE ITEM 1			See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.	
Diesel Generator Breaker Open				N.A.	N.A.

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM
INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	ALLOWANCE (TA)	Z	S	TRIP SETPOINT	ALLOWABLE VALUE#
7. Loss of Power (Continued)					
c. 480V Load Centers (Inverse Time Relays) Degraded Voltage					
Load Center					
3A	[ ]	[ ]	[ ]	419V±5V(60 sec ±30 sec delay)	[ ]
3B	[ ]	[ ]	[ ]	426V±5V(60 sec ±30 sec delay)	[ ]
3C	[ ]	[ ]	[ ]	427V±5V(60 sec ±30 sec delay)	[ ]
3D	[ ]	[ ]	[ ]	436V±5V(60 sec ±30 sec delay)	[ ]
4A	[ ]	[ ]	[ ]	427V±5V(60 sec ±30 sec delay)	[ ]
4B	[ ]	[ ]	[ ]	424V±5V(60 sec ±30 sec delay)	[ ]
4C	[ ]	[ ]	[ ]	413V±5V(60 sec ±30 sec delay)	[ ]
4D	[ ]	[ ]	[ ]	412V±5V(60 sec ±30 sec delay)	[ ]
Coincident with: Diesel Generator Breaker Open	N A	N.A	N.A	N.A.	N.A.
8. Engineering Safety Features Actuation System Interlocks					
a. Pressurizer Pressure	[ ]	[ ]	[ ]	≤2000 psig	≤[ ] psig
b. T_{avg}--Low	4.0	2.0	1.0	~~≥531°F~~ ≥ 543 °F	~~[ ]~~ ≥ 542.5°F
9. Control Room Ventilation Isolation					
a. Automatic Actuation Logic and Actuation Relays	N.A.	N.A	N.A	N.A.	N.A.
b. Safety Injection	SEE ITEM 1			See Item 1. above for all Safety Injection Trip Setpoints and Allowable Values.	

TABLE 3.3-3 (Continued)

ENGINEERED SAFETY FEATURE ACTUATION SYSTEM INSTRUMENTATION TRIP SETPOINTS

FUNCTIONAL UNIT	TRIP SETPOINT	ALLOWABLE VALUE#
9. Control Room Isolation (Continued)		
c. Containment Radioactivity--High (1)	Particulate (R-11) $<6.1 \times 10^5$ CPM Gaseous (R-12) See (2)	[ ]
d. Containment Isolation Manual Phase A or Phase B	N.A.	N.A.
e. Air Intake Radiation Level)	$\leq$ 2 mR/hr	2.83 mR/hr

TABLE NOTATIONS

(1) Either the particulate or gaseous channel in the OPERABLE status will satisfy this LCO.

(2) Containment Gaseous Monitor Setpoint = $\dfrac{(3.2 \times 10^4)}{(F)}$ CPM,

Where F = $\dfrac{\text{Actual Purge Flow}}{\text{Design Purge Flow (35,000 CFM)}}$

Setpoint may vary according to current plant conditions provided that the release rate does not exceed allowable limits provided in Specification 3.11.2.1.

(3) Auxiliary feedwater manual initiation is included in Specification 3.7.1.2.

INSERT , ALLOWANCE (TA), Z OR S

#If no allowable value is specified so indicated by [ ], the trip setpoint shall also be the allowable value.

	ALLOWANCE (TA)	Z	S
c.	[ ]	[ ]	[ ]
d.	N.A.	N.A.	N.A.
e	[ ]	[ ]	[ ]

INSERT ABOVE

TABLE 4.3-2

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION SURVEILLANCE REQUIREMENTS

CHANNEL FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST#	MODES FOR WHICH SURVEILLANCE IS REQUIRED
1. Safety Injection (Reactor Trip, Turbine Trip, Feedwater Isolation, Control Room Ventilation Isolation, Start Diesel Generators, Containment Phase A Isolation (except Manual SI), Containment Cooling Fans, Containment Filter Fans, Start Sequencer, Component Cooling Water, Start Auxiliary Feedwater and Intake Cooling Water)						
a. Manual Initiation	N.A.	N.A.	N.A.	R	N.A.	1, 2, 3
b. Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	M(1)	1, 2, 3(3)
c. Containment Pressure--High	N.A.	R	N.A.	N.A.	M(1)	1, 2, 3
d. Pressurizer Pressure--Low	S	R	M(5)	N.A.	N.A.	1, 2, 3(3)
e. High Differential Pressure Between the Steam Line Header and any Steam Line	S	R	M(5)	N.A.	N.A.	1, 2, 3(3)
f. Steam Line Flow--High Coincident with:	S	R	M(5)	N.A.	N.A.	1, 2, 3(3)
Steam Generator Pressure--Low	S	R	M(5)	N.A.	N.A.	1, 2, 3(3)
or						
T_{avg}--Low	S	R	~~M(5)~~ Q(5)	N.A.	N.A.	1, 2, 3(3)

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

CHANNEL FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST#	MODES FOR WHICH SURVEILLANCE IS REQUIRED
4. Steam Line Isolation (Continued)						
c. Containment Pressure--High-High Coincident with:	N.A.	R	N.A.	R	M(1)	1, 2, 3
Containment Pressure--High	N.A.	R	N.A.	R	M(1)	1, 2, 3
d. Steam Line Flow--High Coincident with:	S(3)	R	M(5)	N.A.	N.A.	1, 2, 3
Steam Generator Pressure--Low	S(3)	R	M(5)	N.A.	N.A.	1, 2, 3
or						
T_{avg}--Low	S(3)	R	~~M(5)~~ Q(5)	N.A.	N.A.	1, 2, 3
5. Feedwater Isolation						
a. Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	R	1, 2
b. Safety Injection	See Item 1. above for all Safety Injection Surveillance Requirements.					
6. Auxiliary Feedwater (2)						
a. Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	R	1, 2, 3
b. Steam Generator Water Level--Low-Low	S	R	M	N.A.	N.A.	1, 2, 3

TABLE 4.3-2 (Continued)

ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION
SURVEILLANCE REQUIREMENTS

CHANNEL FUNCTIONAL UNIT	CHANNEL CHECK	CHANNEL CALIBRATION	ANALOG CHANNEL OPERATIONAL TEST	TRIP ACTUATING DEVICE OPERATIONAL TEST	ACTUATION LOGIC TEST#	MODES FOR WHICH SURVEILLANCE IS REQUIRED
8. Engineering Safety Features Actuation System Interlocks						
a. Pressurizer Pressure	N.A.	R	M(5)	N.A.	N.A.	1, 2, 3(3)
b. T_{avg}--Low	N.A.	R	~~M(5)~~ Q(5)	N.A.	N.A.	1, 2, 3(3)
9. Control Room Ventilation Isolation						
a. Automatic Actuation Logic and Actuation Relays	N.A.	N.A.	N.A.	N.A.	N.A.	
b. Safety Injection	See Item 1. above for all Safety Injection Surveillance Requirements.					
c. Containment Radioactivity--High	S	R	M	N.A.	N.A.	(4)
d. Containment Isolation Manual Phase A or Manual Phase B	N.A.	N.A.	N.A.	R	N.A.	1, 2, 3, 4
e. Control Room Air Intake Radiation Level	S	R	M	N.A.	N.A.	All

TABLE NOTATIONS

(1) Each train shall be tested at least every 62 days on a STAGGERED TEST BASIS.
(2) Auxiliary feedwater manual initiation is included in Specification 3.7.1.2.
(3) The provisions of Specification 4.0.4 are not applicable for entering Mode 3, provided that the applicable surveillances are completed within 96 hours from entering Mode 3.
(4) Applicable in MODES 1, 2, 3, 4 or during CORE ALTERATIONS or movement of irradiated fuel within the containment.
(5) Test of alarm function not required when alarm locked in.

#At least once per 18 months each Actuation Logic Test shall include energization of each relay and verification of OPERABILITY of each relay.

BASES

3/4.3.1 and 3/4.3.2 REACTOR TRIP SYSTEM and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

The OPERABILITY of the Reactor Trip System and the Engineered Safety Features Actuation System instrumentation and interlocks ensures that: (1) the associated ACTION and/or Reactor trip will be initiated when the parameter monitored by each channel or combination thereof reaches its Setpoint (2) the specified coincidence logic is maintained, (3) sufficient redundancy is maintained to permit a channel to be out-of-service for testing or maintenance (due to plant specific design, pulling fuses and using jumpers may be used to place channels in trip), and (4) sufficient system functional capability is available from diverse parameters.

The OPERABILITY of these systems is required to provide the overall reliability, redundancy, and diversity assumed available in the facility design for the protection and mitigation of accident and transient conditions. The integrated operation of each of these systems is consistent with the assumptions used in the safety analyses. The Surveillance Requirements specified for these systems ensure that the overall system functional capability is maintained comparable to the original design standards. The periodic surveillance tests performed at the minimum frequencies are sufficient to demonstrate this capability.

Under some pressure and temperature conditions, certain surveillances for Safety Injection cannot be performed because of the system design. Allowance to change modes is provided under these conditions as long as the surveillances are completed within specified time requirements.

The Engineered Safety Features Actuation System Instrumentation Trip Setpoints specified in Table 3.3-3 are the nominal values at which the bistables ~~trips~~ are set for each functional unit.

The setpoint is considered to be adjusted consistent with the nominal value when the "as measured" setpoint is within the band allowed for calibration accuracy.

To accommodate the instrument drift that may occur between operational tests and the accuracy to which Setpoints can be measured and calibrated, Allowable Values for the Setpoints have been specified in Table 3.3-3. Operation with Setpoints less conservative than the Trip Setpoint but within the Allowable Value is acceptable since an allowance has been made in the safety analysis to accommodate this error. ~~If no value is listed in the Allowable column, the Setpoint value is the limiting setting.~~

3/4.3 INSTRUMENTATION

BASES

3/4.3.1 and 3/4.3.2 REACTOR TRIP SYSTEM and ENGINEERED SAFETY FEATURES ACTUATION SYSTEM INSTRUMENTATION

For some functions, an optional provision has been included for determining the OPERABILITY of a channel when its trip setpoint is found to exceed the Allowable Value. The methodology of this option utilizes the "as measured" deviation from the specified calibration point for rack and sensor components in conjunction with a statistical combination of the other uncertainties of the instrumentation to measure the process variable and the uncertainties in calibrating the instrumentation. In Equation 2.2-1, $Z + R + S \leq TA$, the interactive effects of the errors in the rack and the sensor, and the "as measured" values of the errors are considered. Z, as specified in Table 3.3-3, in percent span, is the statistical summation of errors assumed in the analysis excluding those associated with the sensor and rack drift and the accuracy of their measurement. TA or Total Allowance is the difference, in percent span, between the trip setpoint and the value used in the analysis for actuation. R or Rack Error is the "as measured" deviation, in percent span, for the affected channel from the specified trip setpoint. S or Sensor Drift is either the "as measured" deviation of the sensor from its calibration point or the value specified in Table 3.3-3, in percent span, from the analysis assumptions. Use of Equation 2.2-1 allows for a sensor drift factor, an increased rack drift factor, and provides a threshold value for REPORTABLE EVENTS.

The methodology to derive the Trip Setpoints includes an allowance for instrument uncertainties. Inherent to the determination of the Trip Setpoints are the magnitudes of these channel uncertainties. Sensor and rack instrumentation utilized in these channels are expected to be capable of operating within the allowances of these uncertainty magnitudes.

Rack drift in excess of the Allowable Value exhibits the behavior that the rack has not met its allowance. Being that there is a small statistical chance that this will happen, an infrequent excessive drift is expected. Rack or sensor drift, in excess of the allowance that is more than occasional, may be indicative of more serious problems and should warrant further investigation.

The Engineered Safety Features Actuation System senses selected plant parameters and determines whether or not predetermined limits are being exceeded. If they are, the signals are combined into logic matrices sensitive to combinations indicative of various accidents events, and transients. Once the required logic combination is completed, the system sends actuation signals to

CONTINUED